

**Samsung Secret****Product Information****Customer : Quatius****DATE : 15. Sep. 2011****SAMSUNG TFT-LCD****MODEL : LTA550HJ12**

The Information Described in this Specification is Preliminary and can be changed without prior notice

LCD Business**Samsung Electronics Co . , LTD.**

Contents**Samsung Secret**

Revision History -----	(3)
General Description -----	(4)
General Information -----	(4)
1. Absolute Maximum Ratings -----	(5)
2. Optical Characteristics -----	(6)
3. Electrical Characteristics -----	(9)
3.1 TFT LCD Module	
3.2 Back Light Unit	
3.3 Inverter Input & Specification	
4. Input Terminal Pin Assignment -----	(12)
4.1 Input Signal & Power	
4.2 Converter Input Pin Configuration	
4.3 Converter Input Power Sequence	
4.4 LVDS Interface	
4.5 Input Signals, Basic Display Colors and Gray Scale of Each Color	
5. Interface Timing -----	(18)
5.1 Timing Parameters (DE only mode)	
5.2 LVDS Input data Characteristics	
5.3 3D mode Sequence	
5.4 Timing Diagrams of interface Signal (DE only mode)	
5.5 Power ON/OFF Sequence	
6. Outline Dimension -----	(22)
7. Packing -----	(24)
8. Marking & Others -----	(25)
9. General Precaution -----	(26)
9.1 Handling	
9.2 Storage	
9.3 Operation	
9.4 Operation Condition Guide	
9.5 Others	

Revision History

Samsung Secret

Date	Rev. No	Page	Summary
15. Sep . 2011	000	all	First issued

www.panlook.com

General Description

Samsung Secret

Description

LTA550HJ12 is a color active matrix liquid crystal display (LCD) that uses amorphous silicon TFT(Thin Film Transistor) as switching components. This model is composed of a TFT LCD panel, a driver circuit and a back light unit. The resolution of a 55.0" is 1920 x 1080 and this model can display up to 1.07 Billion colors with wide viewing angle of 89° or higher in all directions. This panel is intended to support applications to provide a excellent performance for Flat Panel Display such as Home-alone Multimedia TFT-LCD TV and High Definition TV

Features

- RoHS compliance (Pb-free)
- High contrast ratio & aperture ratio with wide color gamut
- SPVA(Super Patterned Vertical Align) mode
- Wide viewing angle ($\pm 178^\circ$)
- High speed response (& Natural Motion (DFR: Double Frame Rate))
- FHD resolution (16:9)
- Low Power consumption
- Edge Type LED (Light Emitted Diode) BLU
- DE (Data Enable) mode
- 4ch LVDS (Low Voltage Differential Signaling) interface (4pixel/clock)

General Information

Items	Specification	Unit	Note
Module Size	1247.6 (W) X 719.9 (V)	mm	$\pm 1.0\text{mm}$
	29.9(D, T/C~ converter)		
Weight	14.0 (Max)	Kg	
Pixel Pitch	0.630(H) x 0.630(W)	Mm	
Active Display Area	1209.6(H) X 680.4(V)	Mm	
Surface Treatment	Antiglare, Hard-coating(3H)		
Display Colors	10bit – 1.07 B	Colors	
Number of Pixels	1920 x 1080	Pixel	
Pixel Arrangement	RGB vertical stripe		
Display Mode	Normally Black		
Luminance of White	400 (Typ.)	cd/m ²	

Samsung Secret

1. Absolute Maximum Ratings

If the condition exceeds maximum ratings, it can cause malfunction or unrecoverable damage to the device.

Item	Symbol	Min.	Max.	Unit	Note
Power Supply Voltage	V_{DD}	GND-0.5	13.2	V	(1)
Dimming Control	Max. Lum	-	5	V	
Storage temperature	T_{STG}	-20	60	°C	(2)
Operating temperature	T_{OPR}	0	50	°C	
Surface temperature	T_{SUR}	0	60	°C	(3)
Shock (non - operating)	X, Y, Z	-	30	G	(4)
Vibration (non - operating)	V_{NOP}	-	1.5	G	(5)

Note (1) $T_a = 25 \pm 2$ °C

(2) Temperature and relative humidity range are shown in the figure below.

- a. 90 % RH Max. ($T_a \leq 39$ °C)
- b. Relative Humidity is 90% or less. ($T_a > 39$ °C)
- c. No condensation

(3) Although abnormal visual problems can be occurred in T_{SUR} range, the polarizer is not damaged in this range.

(4) 11ms, sine wave, one time for $\pm X$, $\pm Y$, $\pm Z$ axis

(5) 10-300 Hz, Sweep rate 10min, 30min for X, Y, Z axis

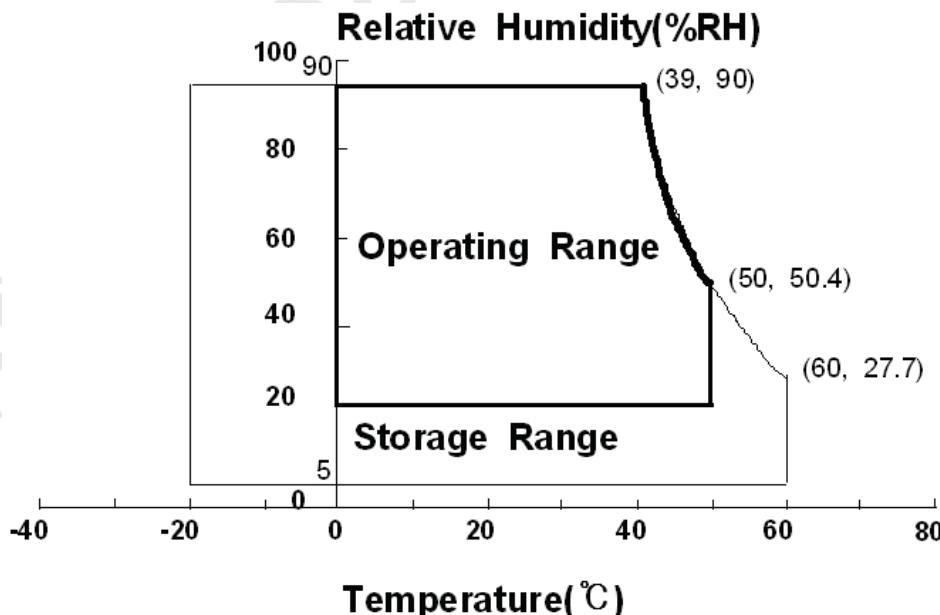


Fig. Temperature and Relative humidity range

2. Optical Characteristics

Samsung Secret

The optical characteristics should be measured in a dark room or equivalent.
Measuring equipment : TOPCON RD-80S, TOPCON SR-3, ELDIM EZ-Contrast

(Ta = 25 ± 2°C, VDD=12V, fv= 120Hz, f_{DCLK} = 297.0MHz, LED Current = 110mA)

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast Ratio (Center of screen)	C/R			3000	5000	-		(1) SR-3
Response Time G-to-G	T _g			-	6	-	msec	(3) RD-80S
Luminance of White (Center of screen)	Y _L			350	400	-	cd/m ²	(4) SR-3
Color Chromaticity (CIE 1931)	Red	R _x	Normal q _{L,R} =0 q _{U,D} =0 Viewing Angle	0.647	TYP. -0.03	TYP. +0.03		(5),(6) SR-3
		R _y		0.333				
	Green	G _x		0.311				
		G _y		0.610				
	Blue	B _x		0.153				
		B _y		0.058				
	White	W _x		0.280				
		W _y		0.290				
Color Gamut	-			-	72.0	-	%	(5) SR-3
Color Temperature	-			-	10,000	-	K	
Viewing Angle	Hor.	q _L	C/R≥10	75	89	-	Degree	(6) EZ-Contrast
		q _R		75	89	-		
	Ver.	q _U		75	89	-		
		q _D		75	89	-		
White Brightness Uniformity (9 Points)	B _{uni}			-	-	33	%	(2) SR-3

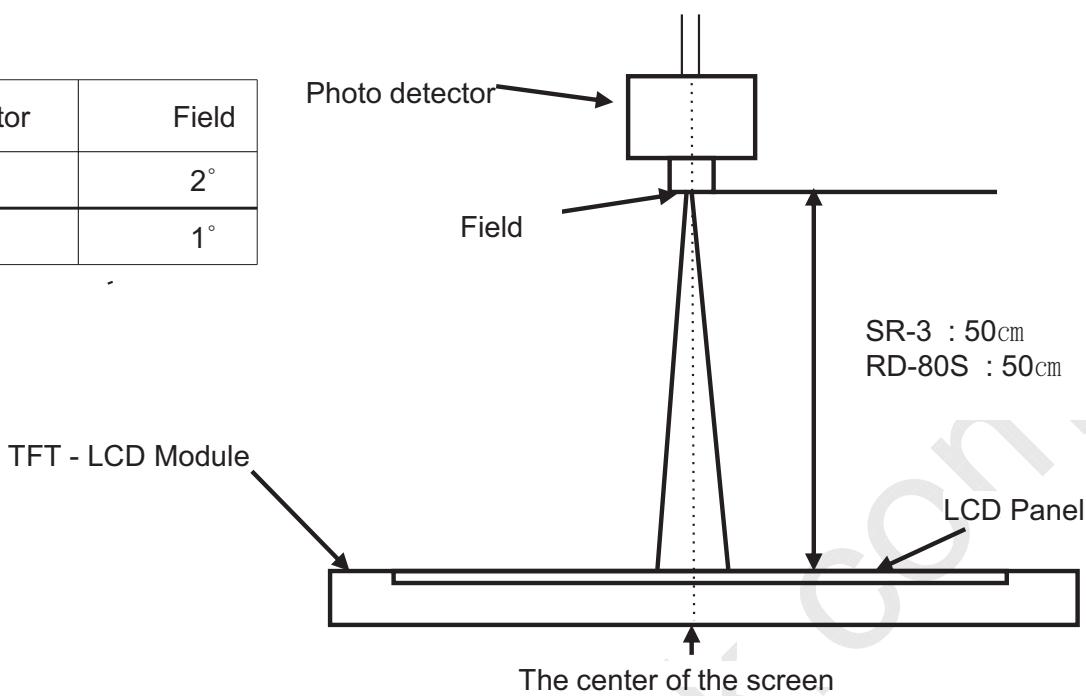
- Test Equipment Setup

The measurement should be executed in a stable, windless and dark room between 40min and 60min after lighting the back light at the given temperature for stabilization of the back light. This should be measured in the center of screen.

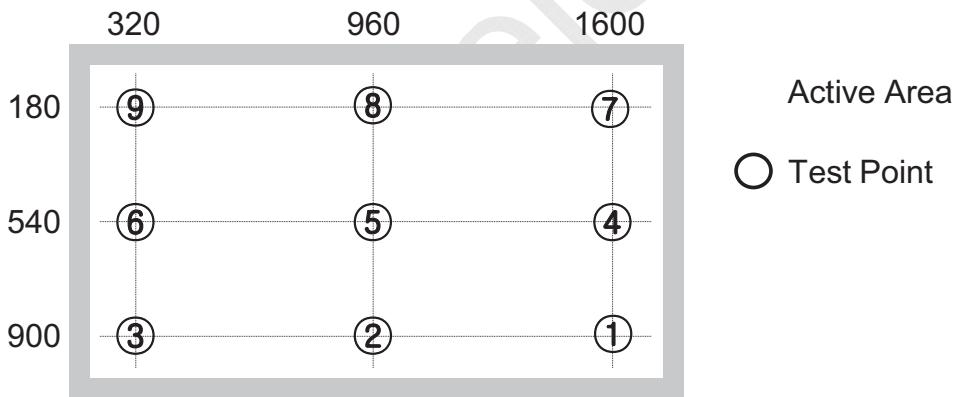
Environment condition : Ta = 25 ± 2 °C

Samsung Secret

Photo detector	Field
SR-3	2°
RD-80S	1°



- Definition of test point



Note (1) Definition of Contrast Ratio (C/R)

: Ratio of gray max (Gmax) & gray min (Gmin) at the center point ⑤ of the panel

$$C/R = \frac{G_{\max}}{G_{\min}}$$

Gmax : Luminance with all pixels white
 Gmin : Luminance with all pixels black

Samsung Secret

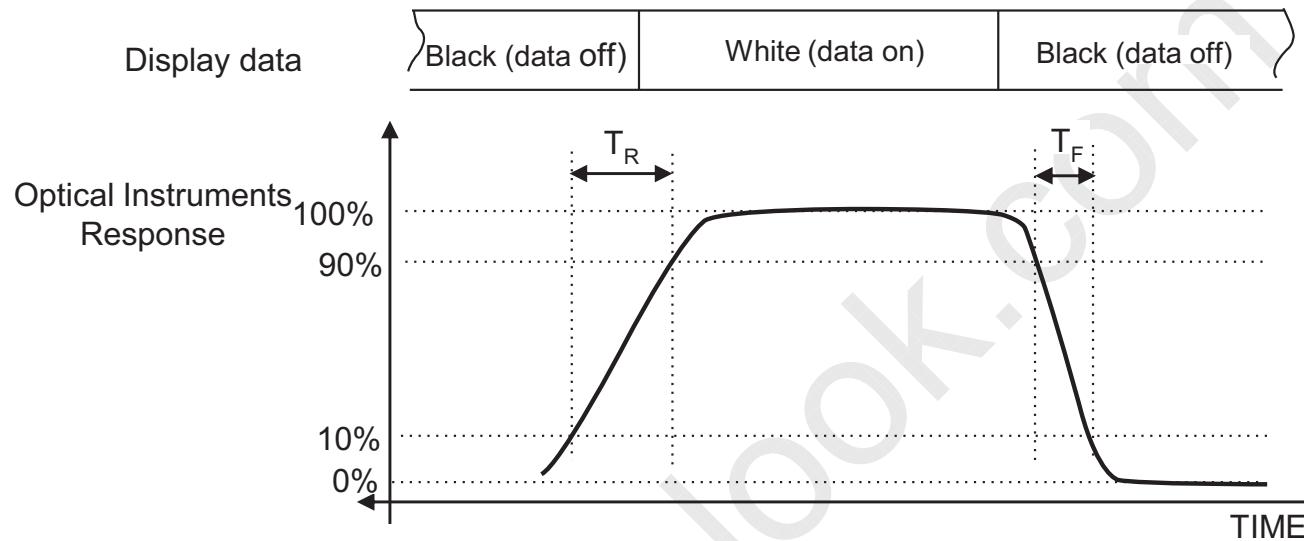
Note (2) Definition of 9 points brightness uniformity (Test pattern : Full White)

$$B_{uni} = 100 * \frac{(B_{max} - B_{min})}{B_{max}}$$

Bmax : Maximum brightness

Bmin : Minimum brightness

Note (3) Definition of Response time : Sum of Tr, Tf



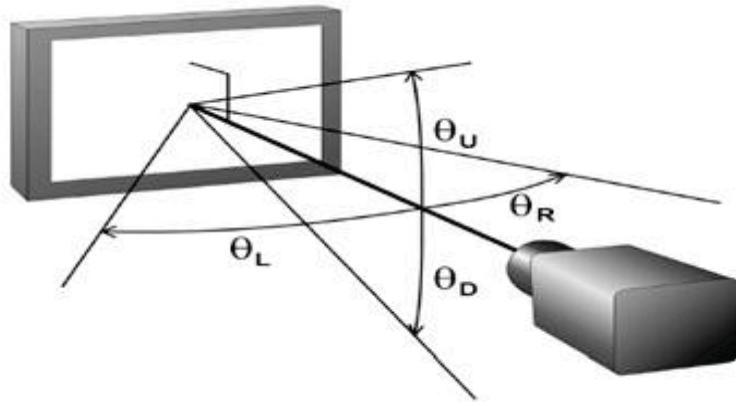
Note (4) Definition of Luminance of White : Luminance of white at center point ⑤

Note (5) Definition of Color Chromaticity (CIE 1931)

Color coordinate of Red, Green, Blue & White at center point ⑤

Note (6) Definition of Viewing Angle

: Viewing angle range ($C/R \geq 10$)



Samsung Secret

3. Electrical Characteristics

3.1 TFT LCD Module

The connector for display data & timing signal should be connected.

$T_a = 25^\circ\text{C} \pm 2^\circ\text{C}$

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Voltage of Power Supply	V_{DD}	10.8	12.0	13.2	V	(1)
Current of Power Supply	I_{DD}	-	700	850	mA	(2),(3)
		-	700	850	mA	
		-	1000	1250	mA	
Vsync Frequency	f_V	95	120.0	125	Hz	
Hsync Frequency	f_H	120	135.0	140	kHz	
Main Frequency	f_{DCLK}	260	297.0	310	MHz	
Rush Current	I_{RUSH}	-	4	6	A	(4)

Note (1) The ripple voltage should be controlled under 10% of V_{DD} .

(2) $f_V = 120\text{Hz}$, $f_{DCLK} = 297.0\text{MHz}$, $V_{DD} = 12.0\text{V}$, DC Current.

(3) Power dissipation check pattern (LCD Module only)

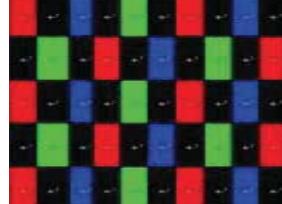
a) Black Pattern



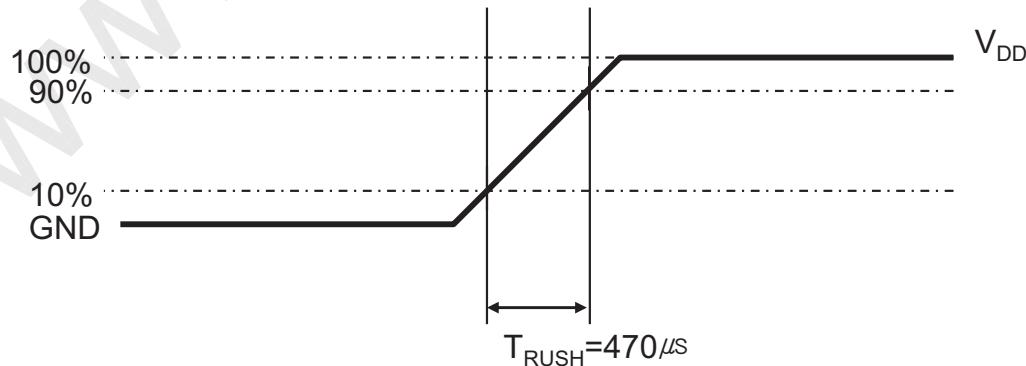
b) White Pattern



c) Sub-checker



(4) Measurement Conditions



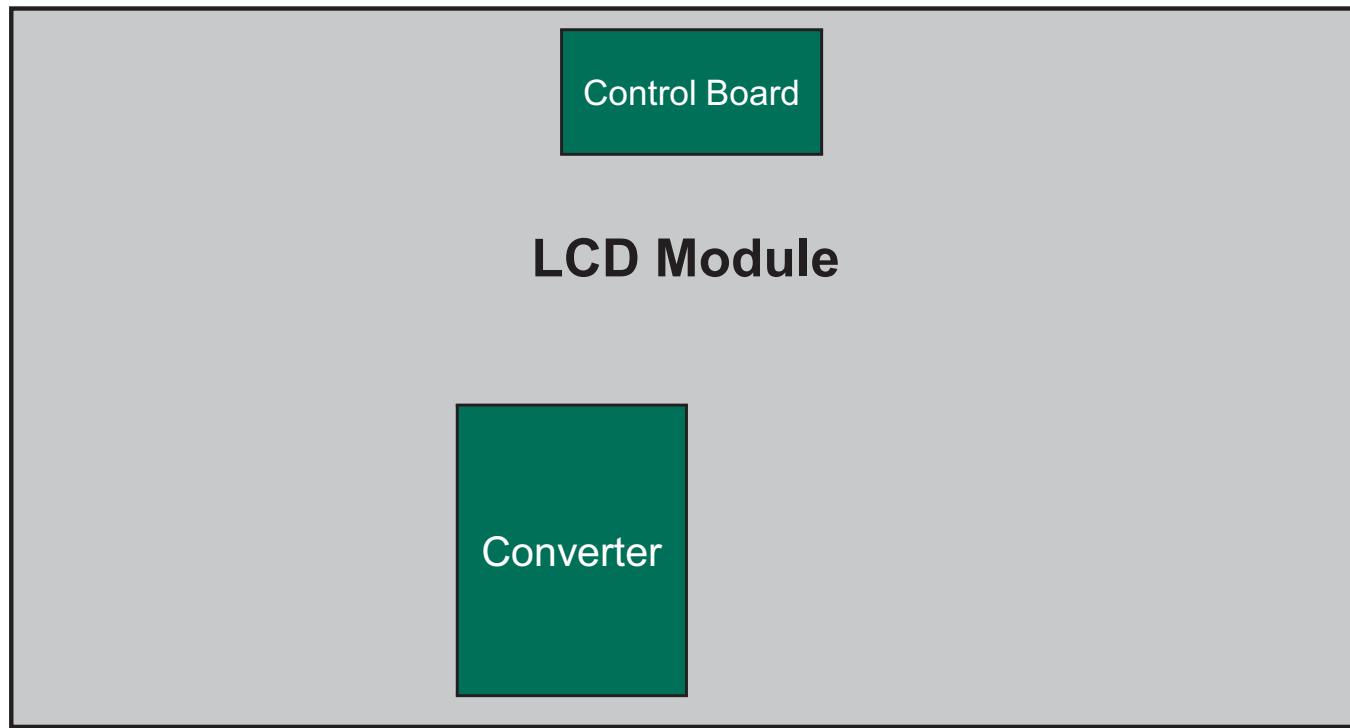
Rush Current I_{RUSH} can be measured when T_{RUSH} is $470\text{ }\mu\text{s}$.

Samsung Secret

3.2 Back Light Unit

The back light unit contains Edge type White LEDs (Light Emitting Diode)

T_a=25 ± 2°C



Item	Symbol	Min.	Typ.	Max.	Unit	Note
Operating Life Time	Hr	30,000	-	-	Hour	(1)

Note (1) It is defined as the time to take until the brightness reduces to 50% of its original value.

[Operating condition : T_a = 25±2°C, For single lamp only.]

3.3 Inverter Input Condition & Specification

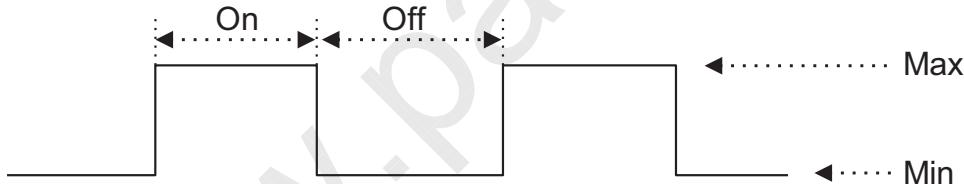
Samsung Secret

Items	Symbol	Conditions	Specifications			Unit	Note	
			Min.	Typ.	Max.			
Input Voltage	V _{in}	-	22	24	26	V	T _a =25±2 °C	
Input Current	I _{RUSH}	V _{in} =24.0V V _{dim} =3.3V	-	-	7.5	A		
Output Current	I _{O (2D)}	V _{in} = 24.0V V _{dim} =3.3 V	133	140	147	mAmps	Note (1)	
	I _{O (3D)}	3D ENA = ON	218.5	230	241.5			
Backlight On/Off	ON	V _{in} =24.0 V	2.4	-	5.5	V	Note(2)	
	OFF	V _{in} =24.0 V	-0.3	-	0.8			
Dimming Range	V _{DIM}	V _{in} :22~26V	0	-	3.3	V		
Dimming Duty Output	D max	V _{in} =24V Dim:3.3V	100	-	-	%		
	D min	V _{in} =24V Dim:0V	-	-	1			
Dimming Frequency	F _{PWM}	V _{in} =24.0 V	140	150	160	Hz		
External Dimming Duty Range	EX_Dim	V _{in} =22.0~26.0 V Dim Pin(#13):floating	1	-	100	%		
External Dimming Frequency Range	F _{EX_PWM}		95	-	200	Hz		
External Dimming Signal Level	V _{PWM}	High (ON)	2.4	-	5.5	V		
		Low (Off)	0	-	0.8			

Note (1) All data is measured after 120min warm-up.

Note (2) V_Dim and Ex_Dim are available only at Normal 2D mode. (3D ENA = OFF)

Note (3) Duty = On / (On+Off) * 100



- Additional Appendix for Supply Current (Only for Reference_2D mode)

Items	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input Current	lin_overshoot	V _{in} = 24V, Dim=3.3V (Within 1hr at BLU on)	-	4.0	4.1	A
	lin_saturation	V _{in} = 24V, Dim=3.3V (After 1hr Aging)	-	3.9	4.0	A
Power Consumption (Back light)	P_Inrush	V _{in} =24.0V, V _{dim} = 3.3V	-	-	180	Watt
	P_overshoot	V _{in} = 24V, Dim=3.3V (Within 1hr at BLU on)	-	96	98.4	Watt
	P_saturation	V _{in} = 24V, Dim=3.3V (After 1hr Aging)	-	93.6	96	Watt

4. Input Terminal Pin Assignment

: Samsung Secret

4.1.1 Input Signal & Power

Connector : FI-RE41S-HF (JAE/UJU)

Pin	Description	Pin	Symbol	Description
1	Vdd(12V)	21		Rx1[3]P
2	Vdd(12V)	22		Rx1[4]N
3	Vdd(12V)	23		Rx2[4]P
4	Vdd(12V)	24		GND
5	Vdd(12V)	25		Rx3[0]N
6	No Connection	26		Rx3[0]P
7	GND	27		Rx3[1]N
8	GND	28		Rx3[1]P
9	GND	29		Rx3[2]N
10	ODD LVDS SIGNAL	30		Rx3[2]P
11		31		GND
12		32		Rx3CLK-
13		33		Rx3CLK+
14		34		GND
15		35		Rx3[3]N
16		36		Rx3[3]P
17		37		Rx3[4]N
18		38		Rx3[4]P
19		39		GND
20		40		No Connection
		41		No Connection

Note) No Connection : This PINS Should be disconnected because of SEC internal design.

Samsung Secret

4.1.2 Input Signal & Power

Connector : FI-RE51S-HF (JAE/UJU)

Pin	Description		Pin	Description	
1	EVEN LVDS SIGNAL	Vdd(12V)	26	Rx4[0]P	
2		Vdd(12V)	27	Rx4[1]N	
3		Vdd(12V)	28	Rx4[1]P	
4		Vdd(12V)	29	Rx4[2]N	
5		Vdd(12V)	30	Rx4[2]P	
6		No Connection	31	GND	
7		GND	32	Rx4CLK-	
8		GND	33	Rx4CLK+	
9		GND	34	GND	
10		Rx2[0]N	35	Rx4[3]N	
11		Rx2[0]P	36	Rx4[3]P	
12		Rx2[1]N	37	Rx4[4]N	
13		Rx2[1]P	38	Rx4[4]P	
14		Rx2[2]N	39	GND	
15		Rx2[2]P	40	SEC Internal Only (Note 1)	
16		GND	41	SEC Internal Only (Note 1)	
17		Rx2CLK-	42	3D_EN	3D_EN signal (Note 2)
18		Rx2CLK+	43	SEC Internal Only (Note 1)	
19		GND	44	SEC Internal Only (Note 1)	
20		Rx2[3]N	45	SEC Internal Only (Note 1)	
21		Rx2[3]P	46	SEC Internal Only (Note 1)	
22		Rx2[4]N	47	SEC Internal Only (Note 1)	
23		Rx2[4]P	48	3D_SYNC_I	Shutter glass Sync Input signal (Note 3)
24		GND	49	3D_SYNC_O	Shutter glass Sync Signal
25		Rx4[0]N	50	SEC Internal Only (Note 1)	
			51	SEC Internal Only (Note 1)	

Note) No Connection : This PINS Should be disconnected because of SEC internal design.

Note (1) SEC internal Only: These PINS are used only for SAMSUNG. (DO NOT CONNECT)

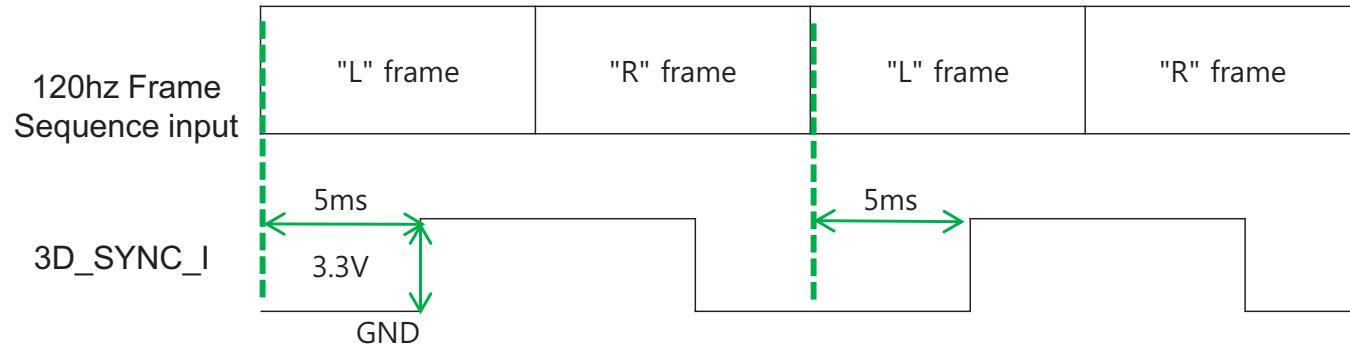
Note (2) 3D Enable / 3D sync_I signal voltage level

High : Min 3V, Max 3.6 V Low : Min 0 V, Max 0.4V

Samsung Secret

Note3) Recommend timing for 3D_SYNC_I Signal .

- Guide Signal to Separate L frame and R frame
- Shutter glass signal & Operation timing also depend on this signal
- To operate 3D function, need this signal from Set A/D board.
(In Order for using it in 2D mode, change the input condition into GND)



Note4) Pin number starts from Right side

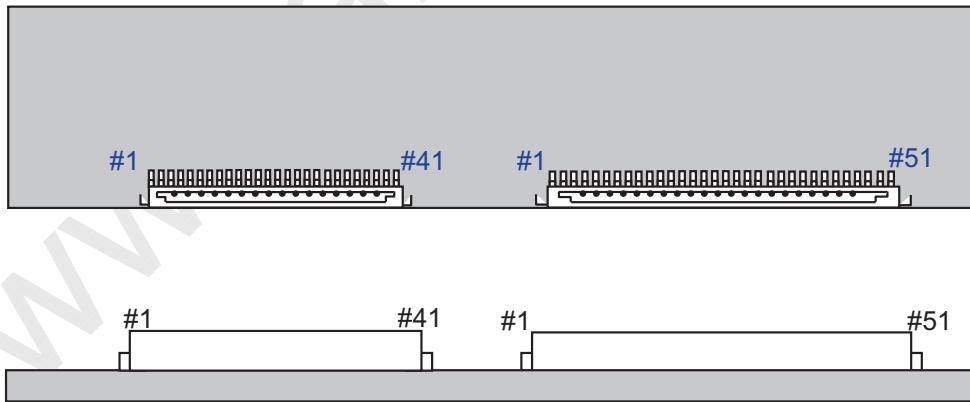
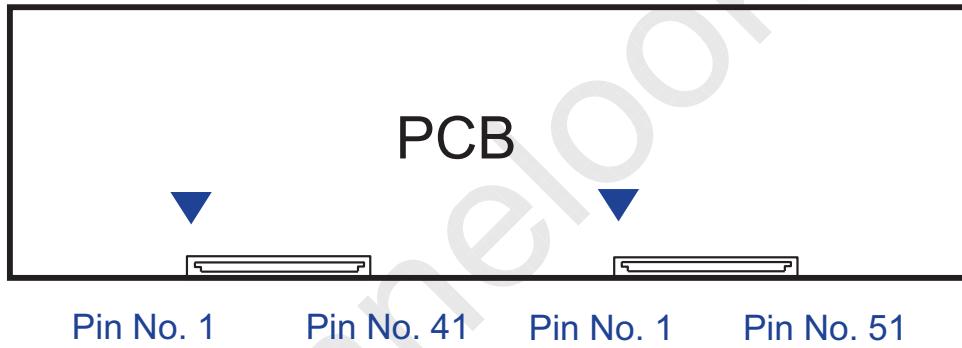


Fig. Connector diagram

- All GND pins should be connected together and also be connected to the LCD's metal chassis.
- All power input pins should be connected together.
- All NC pins should be separated from other signal or power.

4.2. Inverter Input Pin Configuration

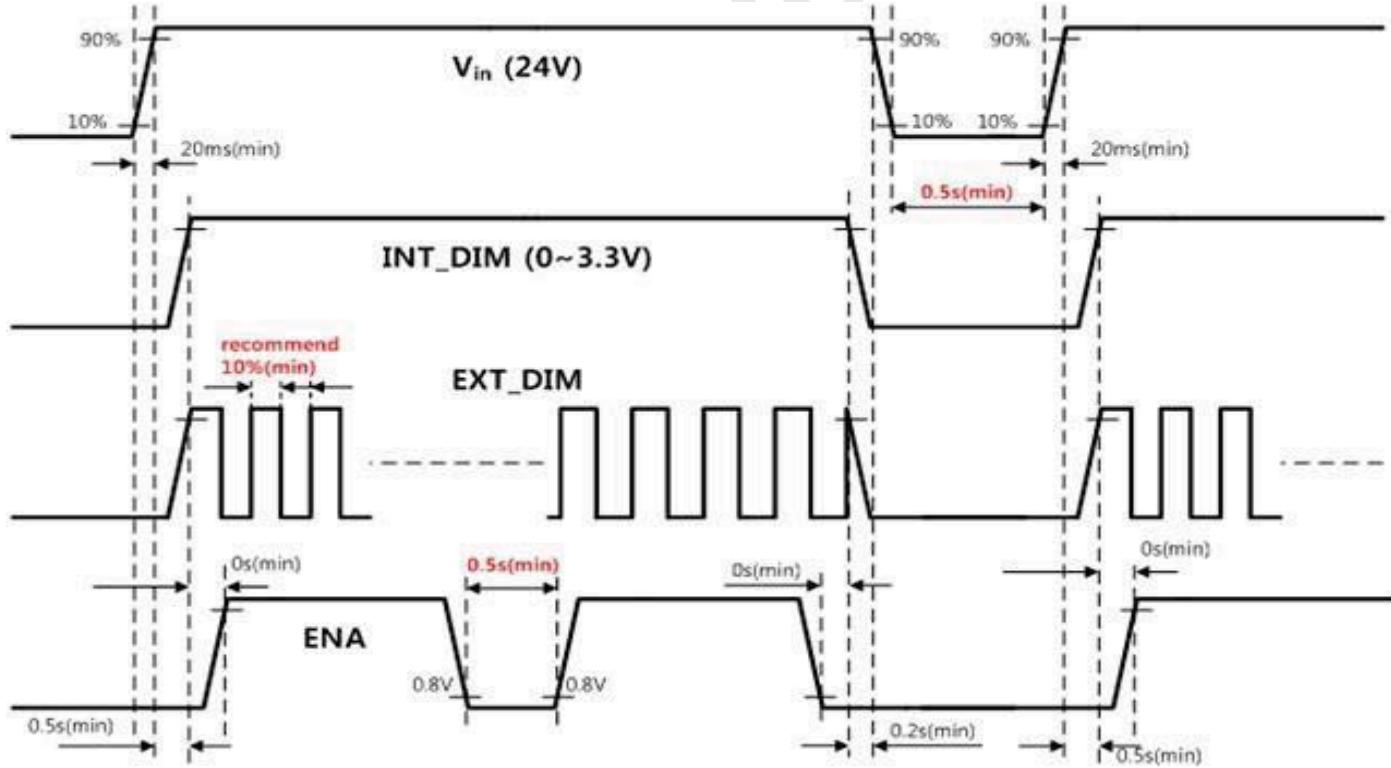
Samsung Secret

Connector : Yeon-ho, 20022WR-14B1

Pin No.	Pin Configuration(FUNCTION)
	Master
1 ~5	24 V
6~10	GND
11	Error Out
12	Backlight On /Off [ON:2.4 – 5.5 V, OFF: 0 - 0.8 V]
13	Dimming Control [0V:Min, 3.3V:Max] *Note(1)
14	External PWM [1~100%] *Note(1)

Note(1) If use Dimming Control, Pin 14 Must be N.C
 If use External PWM, Pin 13 Must be N.C

4.3. Inverter Input Power Sequence



Note) SEQUENCE : ON = V_{in}(24V) > Dimming Control ≥ Backlight On/Off
 OFF = Backlight On/Off ≥ Dimming Control > V_{in}(24V)

4.4 LVDS Interface

- LVDS Receiver : T-con (merged)
- Data Format (JEIDA Only)

Samsung Secret

	LVDS pin	JEIDA -DATA
TxOUT/RxIN0	TxIN/RxOUT0	R4
	TxIN/RxOUT1	R5
	TxIN/RxOUT2	R6
	TxIN/RxOUT3	R7
	TxIN/RxOUT4	R8
	TxIN/RxOUT6	R9
	TxIN/RxOUT7	G4
TxOUT/RxIN1	TxIN/RxOUT8	G5
	TxIN/RxOUT9	G6
	TxIN/RxOUT12	G7
	TxIN/RxOUT13	G8
	TxIN/RxOUT14	G9
	TxIN/RxOUT15	B4
	TxIN/RxOUT18	B5
TxOUT/RxIN2	TxIN/RxOUT19	B6
	TxIN/RxOUT20	B7
	TxIN/RxOUT21	B8
	TxIN/RxOUT22	B9
	TxIN/RxOUT24	HSYNC
	TxIN/RxOUT25	VSYNC
	TxIN/RxOUT26	DEN
TxOUT/RxIN3	TxIN/RxOUT27	R2
	TxIN/RxOUT5	R3
	TxIN/RxOUT10	G2
	TxIN/RxOUT11	G3
	TxIN/RxOUT16	B2
	TxIN/RxOUT17	B3
	TxIN/RxOUT23	RESERVED
TxOUT/RxIN4	TxIN/RxOUT28	R0
	TxIN/RxOUT29	R1
	TxIN/RxOUT30	G0
	TxIN/RxOUT31	G1
	TxIN/RxOUT32	B0
	TxIN/RxOUT33	B1
	TxIN/RxOUT34	RESERVED

Samsung Secret

4.5 Input Signals, Basic Display Colors and Gray Scale of Each Color

COLOR	DISPLAY (10bit)	DATA SIGNAL																												GRAY SCALE LEVEL		
		RED										GREEN										BLUE										
		R0	R1	R2	R3	R4	R5	R6	R7	R8	R9	G0	G1	G2	G3	G4	G5	G6	G7	G8	G9	B0	B1	B2	B3	B4	B5	B6	B7	B8	B9	
BASIC COLOR	BLACK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	
	BLUE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	-	
	GREEN	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	-		
	CYAN	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-		
	RED	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-		
	MAGENTA	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	-		
	YELLOW	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	-		
	WHITE	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-		
GRAY SCALE OF RED	BLACK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R0		
	DARK ↑ LIGHT	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R1		
		0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R2		
		:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	R3~R1020			
		:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	R1021			
		1	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R1022		
		0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R1023		
GRAY SCALE OF GREEN	BLACK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	G0		
	DARK ↑ LIGHT	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	G1		
		0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	G2		
		:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	G3~G1020			
		:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	G1021			
		0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	G1022		
		0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	G1023		
GRAY SCALE OF BLUE	BLACK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	B0		
	DARK ↑ LIGHT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	B1		
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	B2		
		:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	B3~B1020			
		:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	B1021			
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	B1022		
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	B1023		

Note) Definition of Gray :

Rn : Red Gray, Gn : Green Gray, Bn : Blue Gray (n = Gray level)

Input Signal : 0 = Low level voltage, 1 = High level voltage

Samsung Secret

5. Interface Timing

5.1 Timing Parameters (DE mode)

SIGNAL	ITEM	SYMBOL	MIN.	TYP.	MAX.	Unit	NOTE
Clock	Frequency	$1/T_C$	260	297	305	MHz	-
Hsync		F_H	120	135	140	KHz	-
Vsync		F_V	95	120	125	Hz	-
Vertical Display Term	Active Display Period	T_{VD}	-	1080	-	Lines	-
	Vertical Total	T_V	1092	1125	1350	Lines	-
Horizontal Display Term	Active Display Period	T_{HD}	-	1920	-	Clocks	-
	Horizontal Total	T_H	2090	2200	2350	clocks	-

Note) This product is DE mode. But the Hsync & Vsync signal must be inputted

- (1) Test Point : TTL control signal and CLK at LVDS Tx input terminal in system
- (2) Internal VDD = 3.3V
- (3) Spread spectrum
 - Modulation rate (max) : $\pm 1.5\%$
 - Modulation Frequency : under 100KHz

5.2 LVDS Input Data Characteristics

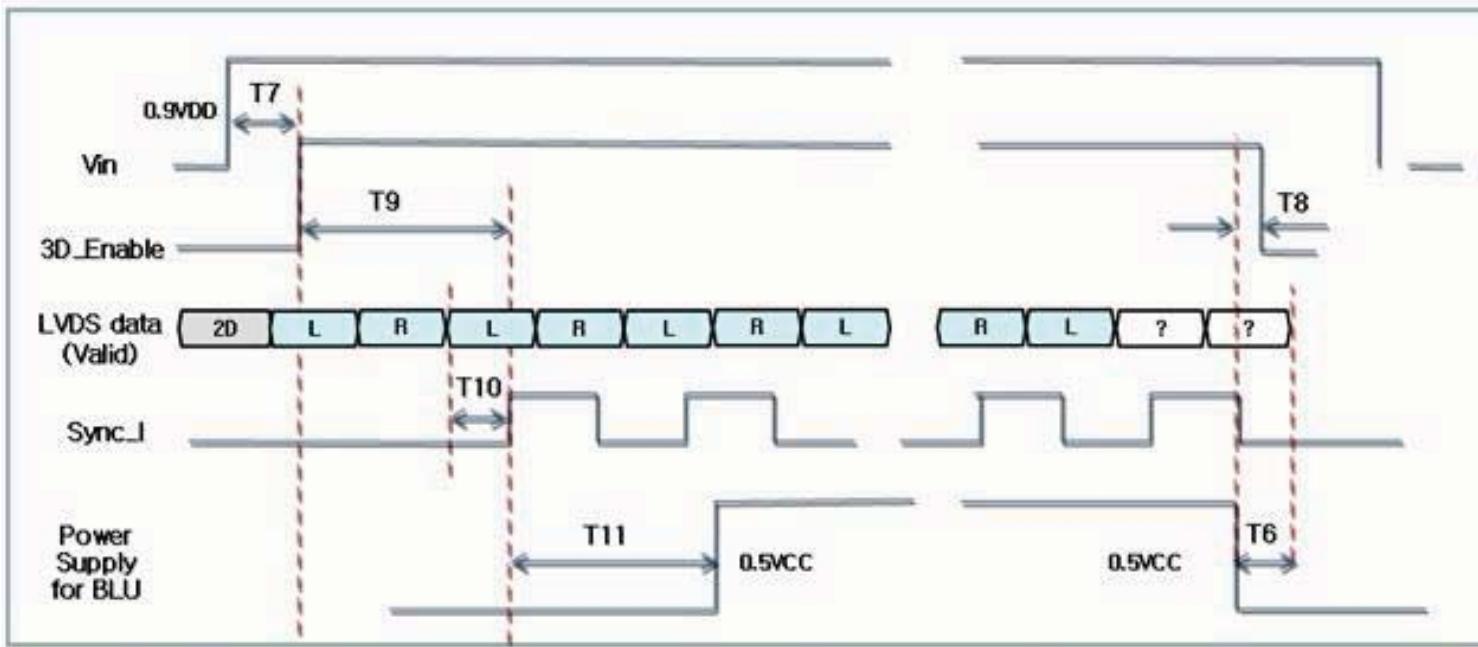
ITEM		SYMBOL	Min.	Typ.	Max.	UNIT	NOTE	
Input Data Position	$F_{IN}=78MHz$	t_{RSRM}	-	-	450	ps		
		t_{RSLM}	-450	-	-	ps		
Input common mode voltage		V_{CM}	0.3	-	1.8	V	-	
Differential Input Voltage		$ V_{ID} $	100	-	600	mV	-	

Note) When the skew is measured the Spread Spectrum should be 0%

Samsung Secret

5.3 3D mode Sequence

5.3.1 3D Sequence



	Spec	Measured	Result		Spec	Measured	Result
T5	≥ 1000 msec			T8	> 0 msec		
T6	≥ 100 msec			T9	> 0 msec		
T7	≥ 2 sec			T10	Typ. 5msec		

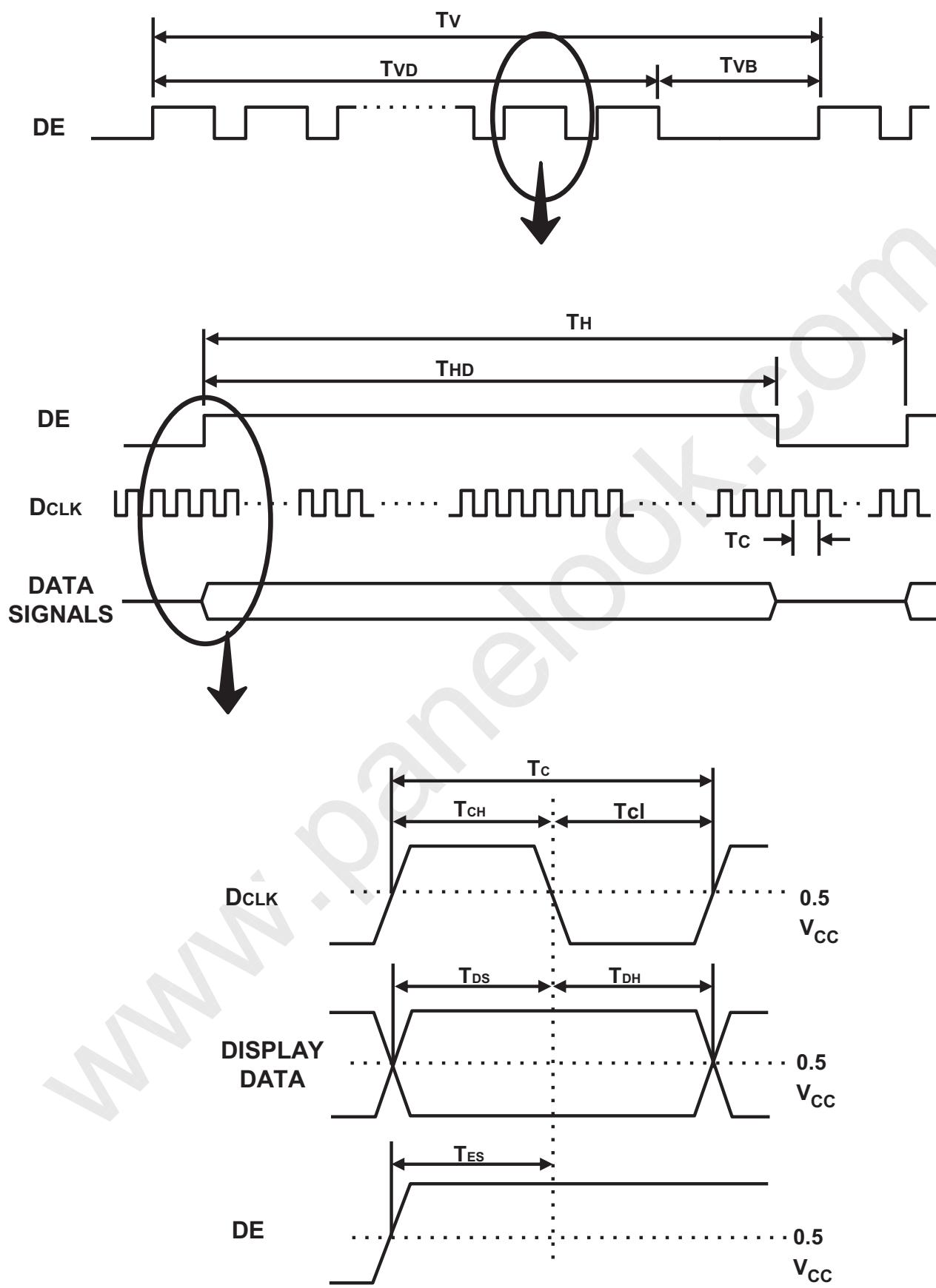
※ T10 : Sync_I is checked with Valid Active L frame

5.3.2 Level of 3D Control signal

Test Items	Test Condition		Spec	
			Min	Max
3D Enable Level	C-PBA Input Level (Change to 3D mode)	High	3.0	3.6
		Low	0.0	0.4
3D_SYNC_I	C-PBA Input Level (L/R Sync)	High	2.7	3.3
		Low	0.0	0.4
3D_SYNC_O	Shutter Glasses Sync Level	High	2.7	3.3
		Low	0.0	0.4

5. 4 Timing diagrams of interface signal (DE mode)

Samsung Secret



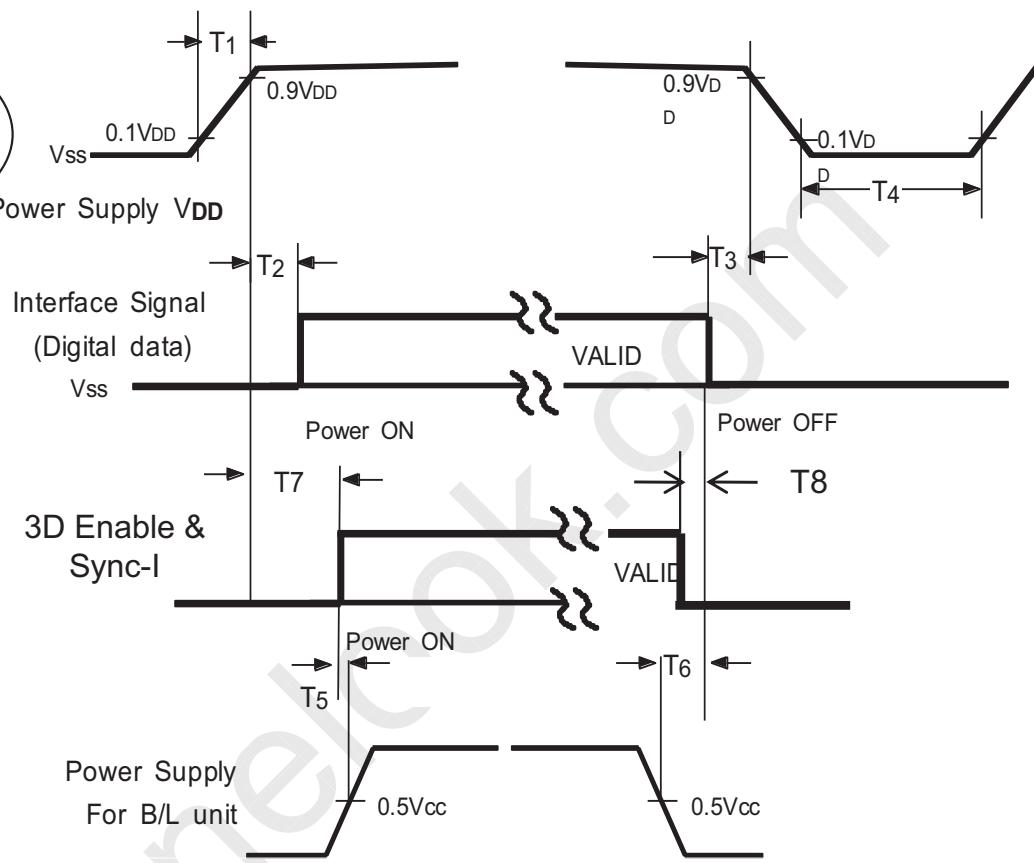
5.5 Power ON/OFF Sequence

Samsung Secret

To prevent a latch-up or DC operation of the LCD Module, the power on/off sequence should be as the diagram below.

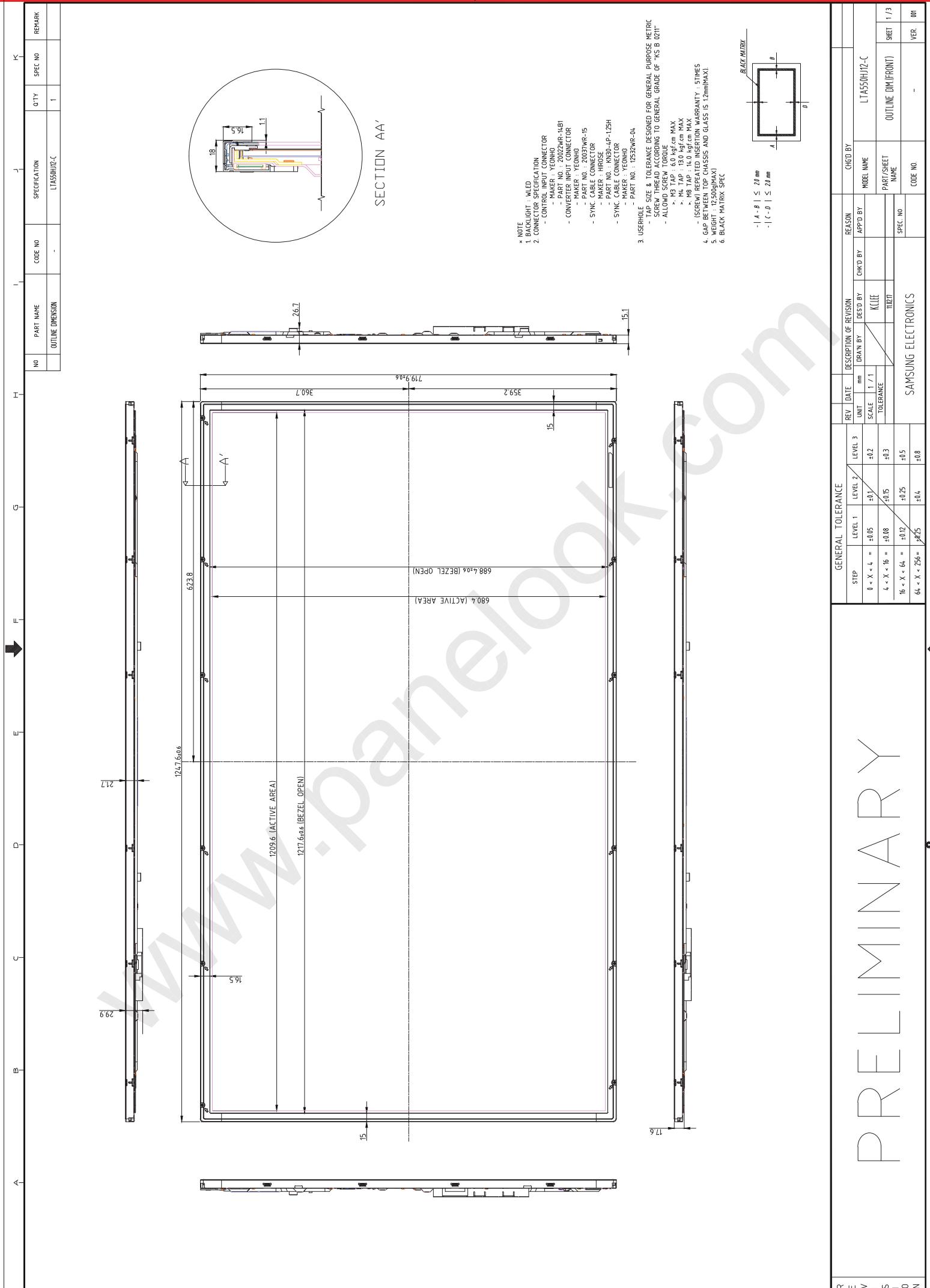
$1\text{msec} < T1 \leq 10\text{msec}$
 $0\text{msec} < T2 \leq 50\text{msec}$
 $0 < T3 \leq 50\text{msec}$
 $1000\text{msec} \leq T4$

$1000\text{ msec} \leq T5$
 (Recommend Value)
 $100\text{msec} \leq T6$
 (Recommend Value)
1sec $\leq T7$
100msec $\leq T8$

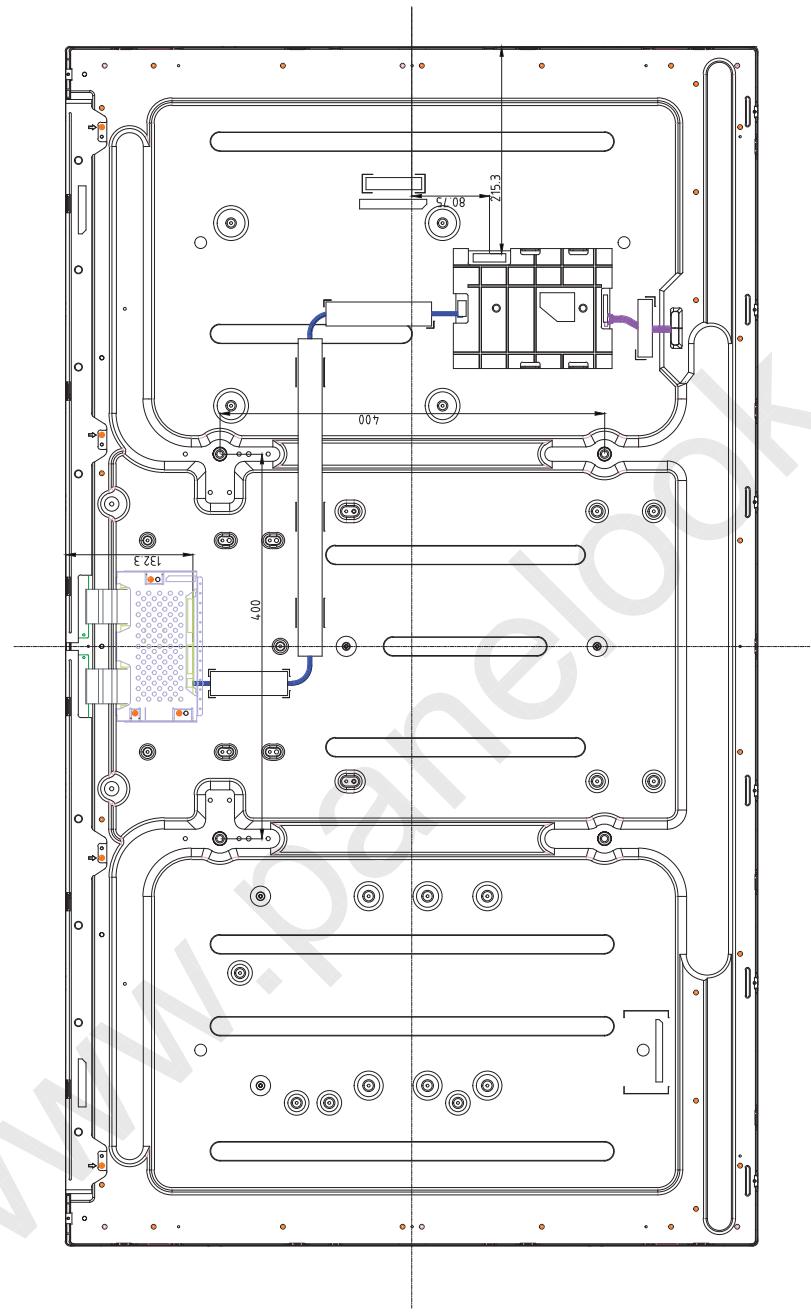


- $T1$: V_{DD} rising time from 10% to 90%
- $T2$: The time from V_{DD} to valid data at power ON.
- $T3$: The time from valid data off to V_{DD} off at power Off.
- $T4$: V_{DD} off time for Windows restart
- $T5$: The time from valid I2C Signal to B/L enable at power ON.
- $T6$: The time from valid data off to B/L disable at power Off.
- $T7$: The time from V_{DD} to valid 3D enable & Sync-I signal to control.

- The supply voltage of the external system for the Module input should be the same as the definition of V_{DD} .
- Apply the lamp voltage within the LCD operation range. When the back light turns on before the LCD operation or the LCD turns off before the back light turns off, the display may momentarily show abnormal screen.
- In case of $V_{DD} = \text{off level}$, please keep the level of input signals low or keep a high impedance.
- $T4$ should be measured after the Module has been fully discharged between power off and on period.
- Interface signal should not be kept at high impedance when the power is on.
- In Case $T5$ is less than 1000msec and $T6$ is less than 100msec, Garbage Display can be seen. (It is not related to electrical function issue, Just for recommendation to prevent Garbage Display)



NO	PART NAME	CODE NO	SPECIFICATION	QTY	SPEC NO	REMARK
OUTLINE DIMENSION	-		L1A500H12-C	1		



GENERAL TOLERANCE			REVISION			REASON			CHECKED BY		APPROVED BY		MODEL NAME		DRAWING BY	
STEP	LEVEL 1	LEVEL 2	REV	DATE	UNIT	DRAWN BY	DECD BY	DECD BY	PART/SHEET	NAME	NAME	NAME	NAME	NAME	NAME	NAME
0 < X < 4 =	± 0.05	± 0.1			mm											
4 < X < 16 =	± 0.08	± 0.15														
16 < X < 64 =	± 0.12	± 0.25														
64 < X < 256 =	± 0.25	± 0.4														

PRELIMINARY

R	E	>	S	>	N											
1	2		3		4											
5	6		7		8											
9	10		11		12											
13	14		15		16											
17	18		19		20											
21	22		23		24											
25	26		27		28											
29	30		31		32											
33	34		35		36											
37	38		39		40											
41	42		43		44											
45	46		47		48											
49	50		51		52											
53	54		55		56											
57	58		59		60											
61	62		63		64											
65	66		67		68											
69	70		71		72											
73	74		75		76											
77	78		79		80											
81	82		83		84											
85	86		87		88											
89	90		91		92											
93	94		95		96											
97	98		99		100											
101	102		103		104											
105	106		107		108											
109	110		111		112											
113	114		115		116											
117	118		119		120											
121	122		123		124											
125	126		127		128											
129	130		131		132											
133	134		135		136											
137	138		139		140											
141	142		143		144											
145	146		147		148											
149	150		151		152											
153	154		155		156											
157	158		159		160											
161	162		163		164											
165	166		167		168											
169	170		171		172											
173	174		175		176											
177	178		179		180											
181	182		183		184											
185	186		187		188											
189	190		191		192											
193	194		195		196											
197	198		199		200											
201	202		203		204											
205	206		207		208											
209	210		211		212											
213	214		215		216											
217	218		219		220											
221	222		223		224											
225	226		227		228											
229	230		231		232											
233	234		235		236											
237	238		239		240											
241	242		243		244											
245	246		247		248											
249	250		251		252											
253	254		255		256											
257	258		259		260											
261	262		263		264											
265	266		267		268											
269	270		271		272											
273	274		275		276											
277	278		279		280											
281	282		283		284											
285	286		287		288											
289	290		291		292											
293	294		295		296											
297	298		299		300											
301	302		303		304											
305	306		307		308											
309	310		311		312											
313	314		315		316											
317	318		319		320											
321	322		323		324											
325	326		327		328											
329	330		331		332											
333	334		335		336											
337	338		339		340											
341	342		343		344											
345	346		347		348											
349	350		351		352											
353	354		355		356											
357	358		359		360											
361	362		363		364											
365	366		367		368											
369	370		371		372											
373	374		375		376											
377	378		379		380											
381	382		383		384											
385	386		387		388											
389	390		391		392											
393	394		395		396											
397	398		399		400											
401	402		403		404											
405	406		407		408											
409	410		411		412											
413	414		415		416											
417	418		419		420											
421	422		423		424											
425	426		427		428											
429	430		431		432											

Samsung Secret

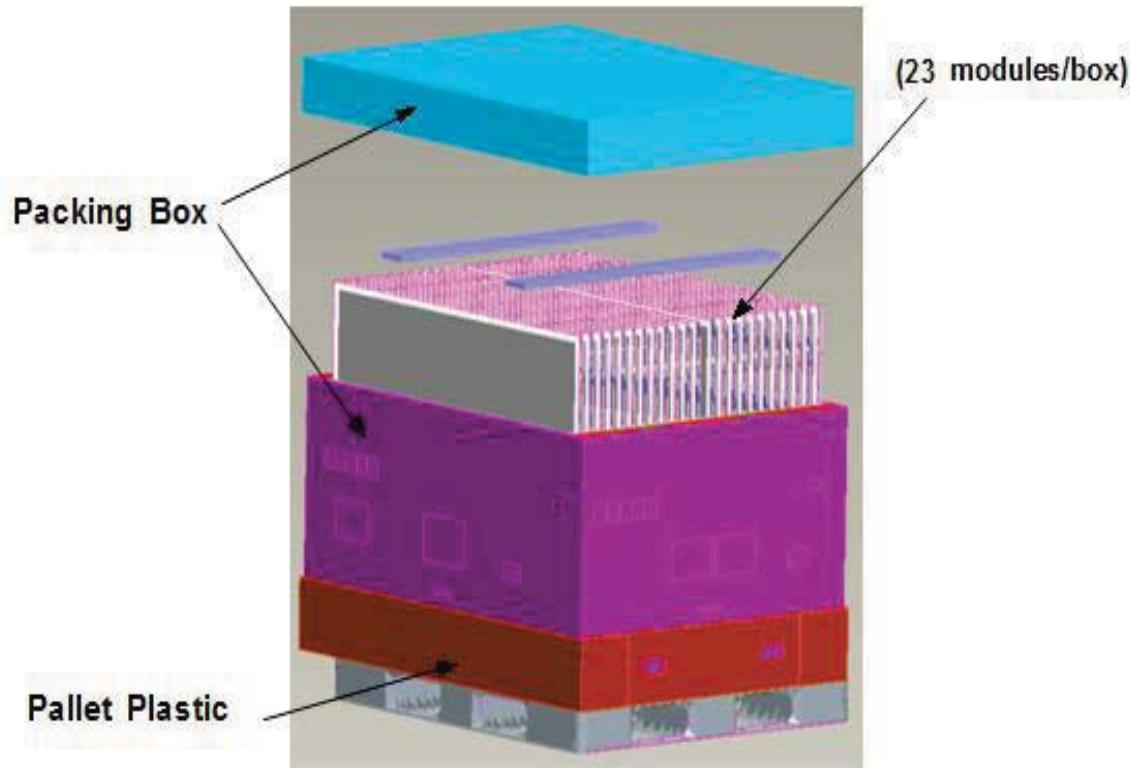
7. PACKING

7.1 CARTON (Internal Package)

(1) Packing Form

Corrugated fiberboard box and corrugated cardboard as shock absorber

(2) Packing Method



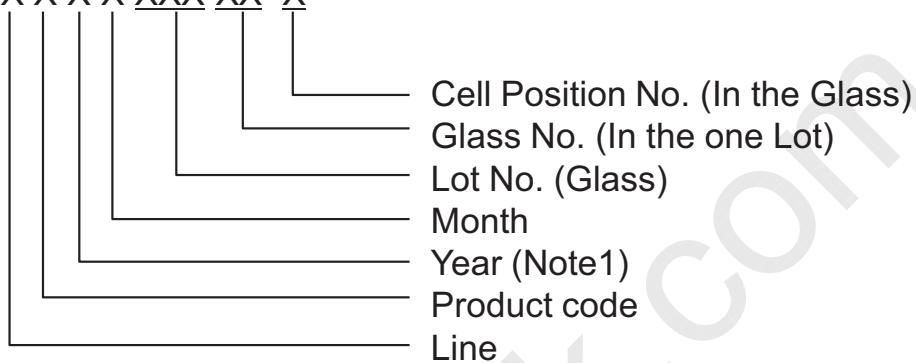
7.2 Packing Specification

Item	Specification	Remark
LCD Packing	23 ea / (Packing-Pallet Box)	1. 13 kg / LCD (ea) 2. 28.5 kg/ Packing Set 3. Packing Material : paper
Pallet	1Box / Pallet	1. Pallet weight = 9.3 kg
Packing Direction	-	-
Total Pallet Size	H x V x height	1150mm(H) x 1470mm(V) x 907mm(height)
Total Pallet Weight	338.64kg	Module (13kgx 23) + Pallet (9.3kg) + Packing set (28.5kg) + Desiccant (1.84kg)

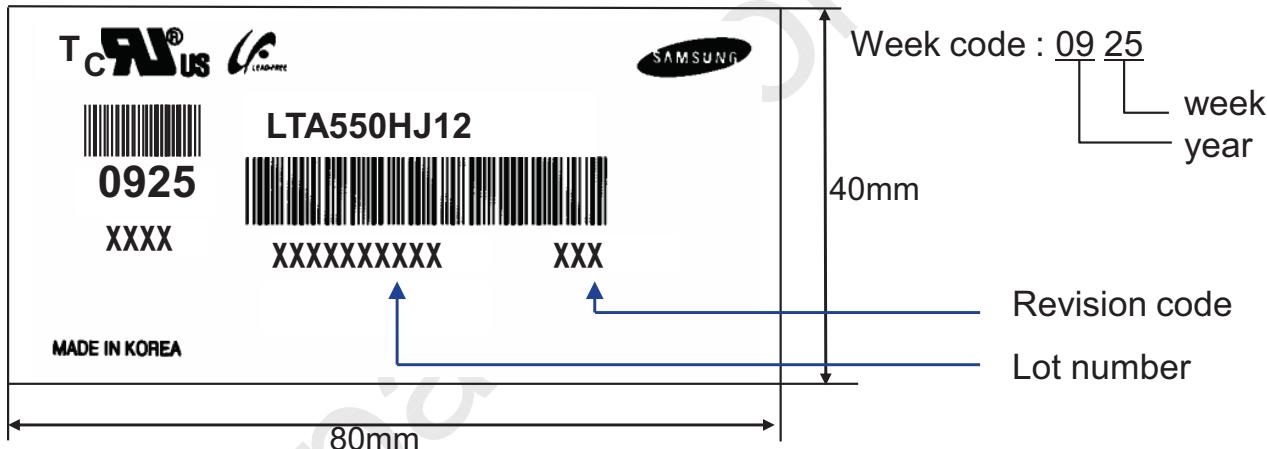
8. MARKING & OTHERS

A nameplate bearing followed by is affixed to a shipped product at the specified location on each product.

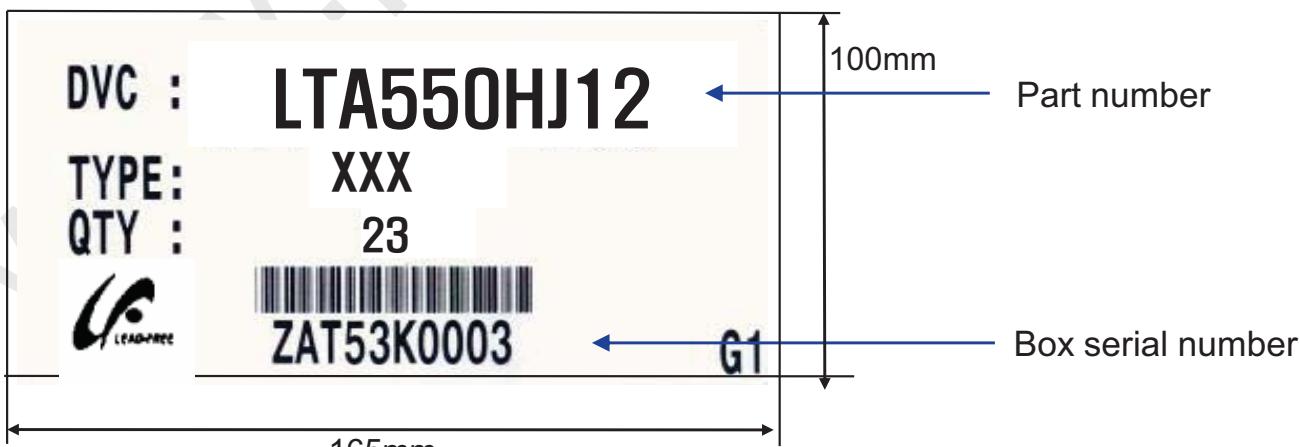
- (1) Part number : LTA550HJ12
- (2) Revision: Three letters
- (3) Lot number : X X X X XXX XX X



(4) Nameplate Indication



(5) Packing box attach



(6) Others

1. After service part

Lamps cannot be replaced because of the narrow bezel structure.

MODEL LTA550HJ12 Doc. No 06-000-G-20110915 Page 25 / 28

9. General Precautions

Samsung Secret

9.1 Handling

- (a) When the Module is assembled, it should be attached to the system firmly using all mounting holes. Be careful not to twist and bend the Module.
- (b) Because the inverter use high voltage, it should be disconnected from power before it is assembled or disassembled.
- (c) Refrain from strong mechanical shock and / or any force to the Module. In addition to damage, this may cause improper operation or damage to the Module and LED back light.
- (d) Note that polarizers are very fragile and could be damage easily. Do not press or scratch the surface harder than a HB pencil lead.
- (e) Wipe off water droplets or oil immediately. If you leave the droplets for a long time, staining or discoloration may occur.
- (f) If the surface of the polarizer is dirty, clean it using absorbent cotton or soft cloth.
- (g) Desirable cleaners are water, IPA(Isopropyl Alcohol) or Hexane. Do not use Ketone type materials(ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanent damage to the polarizer due to chemical reaction.
- (h) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth . In case of contact with hands, legs or clothes, it must be washed away with soap thoroughly.
- (i) Protect the module from Electrostatic discharge. Otherwise the ASIC IC or semiconductor would be damaged.
- (j) Use finger-stalls with soft gloves in order to keep display clean during the incoming inspection and assembly process.
- (k) Do not disassemble the Module.
- (l) Do not disassemble shield case of inverter & LVDS board
- (m) Do not connect N.C pins. (Samsung internal use only)
- (n) Protection film for polarizer on the Module should be slowly peeled off just before use so that the electrostatic charge can be minimized. Must put on antistatic glove while handling a module
- (o) Pins of I/F connector should not be touched directly with bare hands.

Samsung Secret

9.2 Storage

- (a) Do not leave the module in high temperature, and high humidity for a long time.
It is highly recommended to store the module with temperature from 5 to 40°C and relative humidity of less than 70%.
- (b) Do not store the TFT-LCD module in direct sunlight.
- (c) The module shall be stored in a dark place. It is prohibited to apply sunlight or fluorescent light during the store.
- (d) Storage condition of Packing

ITEM	UNIT	Min.	Max.
Storage Temperature	(°C)	5	40
Storage Humidity	(%rH)	35	75
Storage Life	12 months		
Storage Condition	<ul style="list-style-type: none"> -Prohibit direct sunlight -Ventilation in storehouse and control changing temperature is within limits of environment -Put it on pallet and store them with removing from wall. -Don't wet Out-BOX and avoid rain. -Without condensation. -Etc. Avoid harmful Condition 		
Long-term Storage Process	<ul style="list-style-type: none"> -More than 3 months Storage or Low temp. Delivery/under 5°C storage →On the 20°C, 50%rH Condition, more than 10hr release. 		

9.3 Operation

- (a) Do not connect or disconnect the Module in the "Power On" condition.
- (b) Power supply should always be turned on/off by the "Power on/off sequence"
- (c) Module has high frequency circuits. Sufficient suppression to the electromagnetic interference should be done by system manufacturers. Grounding and shielding methods may be important to minimize the interference.
- (d) The cable between the back light connector and its inverter power supply should be connected directly with a minimized length. A longer cable between the back light and the inverter may cause lower luminance of lamp(LED) and may require higher startup voltage(Vs).

9.4 Operation Condition Guide

Samsung Secret

(a) The LCD product should be operated under normal conditions.

Normal condition is defined as below;

- Temperature : $20 \pm 15^\circ\text{C}$
- Humidity : $55 \pm 20\%$
- Display pattern : continually changing pattern (Not stationary)

(b) If the product will be used in extreme conditions such as high temperature, humidity, display patterns or operation time etc.., It is strongly recommended to contact SEC for Application engineering advice. Otherwise, its reliability and function may not be guaranteed. Extreme conditions are commonly found at Airports, Transit Stations, Banks, Stock market, and Controlling systems.

9.5 Others

(a) Ultra-violet ray filter is necessary for outdoor operation.

(b) Avoid condensation of water. It may result in improper operation or disconnection of electrode.

(c) Do not exceed the absolute maximum rating value. (supply voltage variation, input voltage variation, variation in part contents and environmental temperature, and so on)
Otherwise the Module may be damaged.

(d) If the Module keeps displaying the same pattern for a long period of time, the image may be "sticked" to the screen.

To avoid image sticking, it is recommended to use a screen saver.

(e) This Module has its circuitry PCB's on the rear side and should be handled carefully in order not to be stressed.

(f) Please contact SEC in advance when you display the same pattern for a long time.